Description

Method of monitoring for availability of a system function in a computer system

To date, digital switching systems (e.g. the systems EWSD and EWSX from Siemens AG) contained no function which monitored particular functionalities distributed over a large number of HW units (platforms). This created the following technical problems:

- If HW units were no longer active on account of errors (HW or SW), the operator himself had to deduce which functionalities of the system had been lost.
- Routine tests on HW units meant that there was the possibility that particular functionalities were no longer available, since HW units were automatically disconnected during routine tests.
- An operator was able to deactivate HW units without receiving any indication of which functionalities of the system would be lost as a result of the deactivation.

Of the problems indicated above, only the first has been partially solved:

- Detection of whether a particular functionality is not available in the system was provided exclusively during the startup phase (in EWSD: adjudgement of #7 total failure).
- Upon adjudgement of #7 total failure, a recovery escalation is initiated.

Drawbacks of this solution:

- During normal operation, there is to date no direct adjudgement of or monitoring for loss of an important system function.

- There is also no predictive assessment of whether a fundamental system function will be lost on account of an HW configuration.

The invention is based on the object of overcoming the aforementioned drawbacks.

This object is achieved by a method in accordance with claim 1.

According to the invention, an arbitrary system functionality indicated by the network operator is mapped in the database using the data types and the loading types of the HW units. The mapped data are provided with a functional state, are maintained and are assessed on the basis of the system state (including predictively).

The invention is explained in more detail below with reference to the drawing, the drawing comprising two figures.

FIGURE 1 shows a general association between data types and HW units.

The following (operator-related) data types exist on the systems EWSD and EWSX:

- CALLP (Data for call processing operations)
- CM (Data for call processing operations)
- SLT (Data for #7 signaling and other signaling types)
- SM (Data for #7 signaling)
- PNNI (Data for private networks)
- MN (Data for mobile radio)
- PD (Data for mobile radio)
- LIC (Data for a line termination)

The data types listed above may be available on various HW units MP-Dep, for example, as shown in FIGURE 2.

In addition to the data types mentioned, the loading type of an HW unit determines whether or not said HW unit is relevant in the context of total failure. Thus, by way of example, the data type SLT is used on the basis of its loading type. That is to say all MP-Deps having the data type SLT hold the same data. The loading type is used to decide which processes ultimately access these data and process them.

The combination of data type and loading type stipulates what functionality is provided by a particular HW unit. Thus, an MP-Dep having the data type SLT may or may not be relevant to #7 signaling, depending on the loading type. For the purposes of simpler illustration, the designation #7-SLT is used below when the loading type of the MP-Dep means that it is relevant to #7 signaling. Otherwise, just the designation SLT is used.

If, by way of example, the system functions "call processing" and "#7 signaling" have now been assessed as being relevant in the context of total failure, the check on the availability of the call processing functionality needs to be assured of the availability of at least one MP-Dep from the set [MP-Dep 1x and MP-Dep 2x] in the example in FIGURE 2. For the #7 functionality, the MP-Deps 1x, 2x and the MP-Dep 40 need to be checked.

Since the network operator would usually wish to define the instant at which system functions are to be assessed as relevant to failure, the aforementioned check must be of flexible design. This is achieved as follows:

- The components (HW units) of the system are mapped in the database,
- for a mapped component, a respective record is made of whether, on the basis of its data and loading type, said component is necessary for one or more system functions which are relevant in the context of failure (the details required for making the aforementioned record can be prescribed by a network operator, for example),
- for a component mapped in this way, an additional record is made of the instant (e.g. during startup, after startup or at any time) at which said component is necessary (the details required for making the aforementioned record can likewise be prescribed by a network operator),
- for each system function, the minimum number of the mapped components which is needed to maintain this very system function is also stipulated,
- for a mapped component, its respective (functional) state is also recorded, i.e. whether or not it is active,
- this state (active/not active) is maintained by the maintenance SW already existing for this purpose,
- any change in a state is reported to the total failure detection unit,
- in this context, this report may be sent before or after a change in a state,
- if this report is sent before the change in a state (e.g. if an operator wants to deactivate components, e.g. HW units, or if a routine test is to be carried out), the total failure detection unit assesses whether deactivating a particular component would result in a particular system function being lost, and notifies the report originator (e.g. maintenance SW, etc.) of this fact,
- if this message is sent after the change in a state (e.g. when a component fails), the total failure detection unit assesses whether deactivation of a

unit

has caused a particular system function to be lost. The result of this assessment is forwarded to the report originator (e.g. protective SW),

- the report originator can now react in the manner which it deems appropriate (alarm, rejection of the operator order, rejection of the routine test (which would result in the unit being disconnected), repetition of startup, etc.).

Abbreviations used:

HW: Hardware

MP-Dep: HW unit

SW: Software